158976

Randall Marshall
Springfield Supervisor
Harza Environmental Services

March 31, 1987

Jerri Yard
for your info

DRAFT

ILLINOIS EPA COMMENTS ON

THE MONSANTO W. G. KRUMMRICH

PLANT AND SAUGET TREATMENT

PLANT SITES

DRAFT

I. INTRODUCTION

Geraghty and Miller, Inc. have prepared two assessments of groundwater conditions at the Monsanto Company W. G. Krummrich Plant and at Village of Sauget Treatment Plant Site. The assessment of conditions at the Sauget Treatment Plant Site is dated December 1986. In addition, Geraghty Miller has prepared a document outlining the proposed remedial action at the Monsanto Krummrich Drum Site. Personnel from the Illinois Environmental Protection Agency and a consultant from Harza Environmental Services, Inc. have reviewed the results and recommendations based on knowledge of the site conditions, state laws and the goals for environmental protection in Illinois.

The personnel performing this review represent many different technical disciplines and areas of responsibility. These comments have been condensed into the next section of this report. Their original comments are included as appendices and referenced in the following sections. Comments that are not referenced or any part of a comment not contained in any appendix can be assumed to be that of the author.

The general conclusions of this joint review can be summarized by stating that the assessment needs to be expanded. Downgradient and deep aquifer conditions are not adequately described. Both onsite and offsite sources of contamination have not been sufficiently identified. The severe groundwater contamination is an area wide problem. The study must be comprehensive in scope. The recommendations for remedial action are far too narrow. Many good possibilities for remedial action were unnecessarily discarded or not considered at all. Known contamination problems representing substantial risks to this public health and environment are dismissed. Comments contained in the following section support the aforementioned conclusions.

II. ILLINOIS EPA COMMENTS ON THE GERAGHTY MILLER ASSESSMENT OF AND RECOMMENDATIONS FOR THE GROUNDWATER CONTAMINATION NEAR MONSANTO IN SAUGET.

A. Extent of Contamination

1. The claim that contaminates have not moved more than 300 feet downgradient in the groundwater from the Krummrich Drum Site is neither proved by the evidence in the report nor accepted by the Agency. Geraghty and Miller presented little information on groundwater conditions downgradient (west) of the drum disposal site particularly around the distance of 300 feet. Monitoring results from the nearest downgradient well, B-29, demonstrate a mean concentration of pollutants 2500 feet downgradient from the drum site of 1,393,000 ug/l in the shallow zone and 359,000 ug/l in the intermediate zone. Monitoring detected large amounts of nitrochlorobenzenes in well B-29 and two nearby wells, B-24 and B-25. Monsanto disposed of large amounts of various nitrochlorobenzenes in the drum site. It has not been demonstrated that these contaminants did not originate in Monsanto's past disposal practices near the Krummrich Drum Site. (See Appendix C)

2. Figures 26 and 27, "Approximate Areas (of) Organic Compound Concentrations . . . on the Monsanto Property" demonstrate the

limits of this study on the groundwater contamination near the W.G. Krummrich Plant. Figures 26 and 27 (from Volume II of the Plant-Wide Assessment) outline the ground water contamination in the shallow (Figure 26) and intermediate zone (Figure 27). A close look at these perimeters reveals that the outlines of the contamination plumes arbitrarily end at the Monsanto property line where Geraghty and Miller stopped their investigation. Apparently, the contamination plume in the shallow zone extends to the should of the Monsanto property and the plume in the intermediate zone extends to the south and west of the Monsanto property. These Figures do not reveal the full extent of the contamination.

A study of the report and Figures 26 and 27 will yield another conclusion. The contamination plume from Monsanto increases in areal size with depth. The increase in groundwater flow velocity with depth causes this increase in areal size of the contamination plume. Geraghty and Miller calculate a flow velocity in the deep zone of 300 times the velocity of the shallow zone. Because of its much higher velocity, the contaminated groundwater in the deep zone has certainly traveled far from the Monsanto property and maybe as far as the Mississippi River. The decrease in concentration with depth is caused primarily by the increase of aquifer flow in the deeper zones rather than a decrease in contaminate loading. The study neglects these facts. (See Appendix A.)

3. The reversal of goundwater flow direction due to decreased pumping has probably had the effect of increasing contaminant concentrations offsite. When heavy pumping from the groundwater system was occurring in the past, it produced deep cones of depression near the sources of the pollutants. These deep cones of depression would have pulled pollutants out of the relatively impermeable shallow zone and into the more permeable intermediate and deep zones where they could travel faster and further. Some of these pollutants were removed by the heavy pumping which also would have tended to confine them near the cones of depression. However, when the pollutants in the groundwater became too much for the local users to bear, they quit pumping and allowed the contamination plumes to spread offsite. Geraghty and Miller did not address the effects of the history of groundwater use at the site on the vertical and areal extent of contamination. (See Appendix A.)

4. The buried drums at the Krummrich Drum Site were very corroded by the time they were removed for proper disposal. Many of these drums had disintegrated completely. The release of pollutants from the buried drums may have occurred over a relatively short portion of the 40 year burial time. This drum disposal area is located at the furthest southwest corner of the Monsanto property. This disposal area may have been effected by the cone of depression located just west of the Monsanto property (Figure 5). The study again neglects history. (See Appendix A.)

5. The study shows a second deep cone of depression just to the west of the Monsanto cone of depression (Figure 5). Geraghty and Miller do not discuss the influence of this cone of depression on contaminate migration. If this pumping continued for even a short time after pumping at the Monsanto plant ceased, then pollutants could have been pulled strongly to the west. There is once again a lack of history.

6. The pollutant plume area affected by the drum site cannot be defined by completed borings or existing wells. The only valued information available is that the drum disposal trench, the soil in the immediate vicinity and the shallow aquifer are highly contaminated. The intermediate and deep zones under the drum disposal area contain contaminated groundwater (GM-31). The study presents little further information on which to base conclusions. (See Appendix A.).

7. The Geraghty and Miller report on groundwater contamination at the Sauget Treatment Plant Sites concludes that contaminats found in the shallow zone are unlikely to have reached the river. The report also suggests that the volatile contamination found in shallow well GM-20A could be from an offsite source. The distance from GM-22A to the nearest upgradient (east) boundary. The distance from GM-22A to the nearest known upgradient source is over 2000 feet. The conclusions that contaminants from the site have not had time to migrate in the shallow zone to the river but have had time to migrate to GM-22A from offsite seem contradictory. The information on the sources of contamination and/or groundwater velocity are incomplete and do not support Geraghty and Miller conclusions (See Appendix B.)

8. One explanation for the groundwater monitoring results at the treatment plant site would be that contaminats are migrating from the lagoons and pit in discreet plumes (or "fingers") rather than one homogeneous plume. This explanation could account for the range of concentrations and constituents identified downgradient. The wells installed onsite could be in different "fingers or missing them altogether. (See Appendix B.)

9. Volatile organic compounds identified in well clusters GM-19, GM-20 and GM-21 increase with depth. Because no downward gradient was detected in the vicinity and because concentrations in these three wells increase with depth, Geraghty and Miller conclude that the volatiles migrated from off site. Concluding the that volatile organics have migrated horizontally to their present locations is easily supported but in the absence of a known offsite source, it is difficult to blame an outride source. GM-22A had the highest level of volatile organic compounds of all wells and is much closer than any offsite source. Other places onsite may just as easily be the source of volatile organics as an offsite source. Onsite sources of contamination have not been adequately addressed by the study. (See Appendix B and Appendix H.)

10. Figure 10 and Figure 13 of the report on the Sauget Treatment Plant Site demonstrate that goundwater flow direction can, and no double has, reversed many times in recent history. Groundwater elevations also vary at such times. The effect of these circumstances on the history of the site, the migration of contaminants and on proposed remedial actions is not discussed in sufficient detail by Geraghty and Miller. (See Appendix B, Appendix C, Appendix E and Appendix G.)

B. IMPACT OF CONTAMINATION

1. The 771bs/day of organics discharged to the Mississippi River is a serious environmental release. This release equates to 14 tons/year. Even if the contaminats are diluted below detection limits in the water, this does not mean that the public health and environment are not affected. Bioaccumulation of pollutants is a demonstrated fact and apparently has occurred in Mississippi River fish. A study conducted by the Food and Drug Administration of organic compounds in Mississippi River fish found the highest level of chloronitrobenzene in fish caught near the site. Chloronitrobenzenes were disposed of in the Krummrich drum site and have been detected in the groundwater. Chloronitrobenzenes were not discovered in fish upstream of Sauget, Illinois but were found in fish as far as 150 miles downstream. (See Appendix C, Appendix F, and Appendix G.)

2. The chloronitrobenzenes found in the fish have many adverse health effects. Vinyl chloride, methylene chloride, pentachlorophenol and benzene found at the Sauget Treatment Plant Site are all carcinogenic. Similar compounds of public health concern have been found at the W.G. Krammrich Plant Site. The contamination of the groundwater and soil at these two sites are very difficult to dismiss as inconsequential. (See Appendix C and Appendix E.)

3. Some of the monitoring wells for this investigation showed high levels of benzene and chlorobenzene. Geraghty and Miller claim that the reported benzene and chlorobenzene levels are suspect because these compounds are found in the lab blanks. The sampling results for well GM-17 show the same high level of benzene contamination over time. In addition, benzene and chlorobenzene were detected at much higher levels in the groundwater samples than in lab blanks which indicates that only a small fraction of the monitoring results for these compounds can be explained by lab error. (See Appendix C.)

4. The report on the Krummrich Plant stated that the effect of the contamination plume upon the region is minimal because few water supply wells are in the area. As few as fifteen years ago more than 20 MGD was being pumped from the aquifer. At present only 0.5 MGD is being pumped. The primary reason for the decrease of pumpage is regional deterioration in water quality. Groundwater contamination has had profound effect upon the region. (See appendix A.)

C. REMEDIAL MEASURES

1. Additional study of both sites is needed. Only a few of the sources of contamination have been adequately identified. The areal extent of groundwater contamination plumes has not been adequately charted especially to the west of the site and in the deep zone. The study concludes that offsite sources have contributed to goundwater contamination under the sites but cannot identify these sources. (See Appendix A, Appendix B, Appendix H and Appendix I.)

2. Additional remedial measure must be considered. Geraghty and Miller rule out incineration as a remedial measure for either site. They claim that incineration is too expensive and will expose the public to air pollutants. They claim that worker risk while excavating wastes or contaminated soil would be too high. Regulatory agencies at all levels of government, the public in many different areas, and many industries have found excavation and incineration to be the optimum remedial alternative as a final solution for cleaning-up contamination. It is difficult to understand how such a common and reliable remedial option becomes impossible when applied to these two sites. (See Appendix E., Appendix I and Appendix G.)

3. River stages affect both groundwater elevation and direction. High river levels can reverse goundwater flow direction and could raise the uppermost aquifer well into highly contaminated areas. This situation would complicate any containment scheme as a remedial measure. (See Appendix C, Appendix E and Appendix G.)

4. The report's recommended remedial action for the lagoons and pit is the construction of slurry walls and a clay cap. The recommendation for slurry walls raises a concern that the consultant lacks confidence in his own analysis. What force could possibly initiate a lateral flow of a somewhat plastic materials through a silty sand medium? Whatever force is contemplated, wouldn't downward flow through the same medium be of greater concern? If concern of lateral movement is great enough to recommend a hundred thousand square foot slurry wall, shouldn't the lagoon and pit floor require some sort of remedial action? Lateral and vertical migration can occur in the shallow zone. It may be possible to inject a chemical grout under the lagoons which would provide for contamination beneath the contaminants. A clay cap would require monitoring and maintenance indefinitely as would other components of a containment system. Containment remedies have been known to fail overtime. (See Appendix B and Appendix E.)

5. Cappping the Krummrich Drum Site with all contamination left in place raises the same concerns expressed in the previous comment. A broader feasibility study might find a remedial action more acceptable than allowing hazardous wastes to remain indefinitely on sand layer 3 feet above the groundwater surface. (See Appendix A and Appendix G).

6. Groundwater contaminants at the W.G. Krummrich Plant were once captured in cones of depression and removed by pumping. A similar system could be implemented as a groundwater remediation measure. The plant uses and no doubt treats river water. Substituting the pumping and treating of contaminated groundwater for use in the plant would be a remedial measure with two virtues. On virtues would be that substituting treatment of groundwater for the treatment of river water. This action would help offset the cost. Because the plant uses large amounts of water, and will hopeful be in production for many years, the requirement that large quantities of groundwater be removed and treated will be met. The second virtue is the inherit fairness of Monsanto returning to use the groundwater resource that they abandoned due to their own pollution and thereby helping restore its original quality.

D. OTHER TECHNICAL ISSUES

1. What is the source of the black silt, sand, gravel and cinders identified on many of the boring descriptions (Vol III. Appendix B)? Was any of this material sampled individually? If so, what are the results? (See Appendix H.)

2. In Volume III page A-4 does not follow A-3 coherently. (See Appendix H.)

3. Volume III, Appendix A states that bentonite slurry was used to seal the annullus directly above the screened interval. However, many of the well construction logs in Appendix C state that pellets were used. How were the pellets hydrated and for how long? (See Appendix H.)

4. Many standards and objectives for chemical contaminants are exceeded by the goundwater contamination at the Krummrich Plant and Sauget Treatment Plant. These contaminants have various human and environmental toxicities. The Mississippi River is the ultimate receiver of many of these chemicals. (See Appendix D.)

E. REGULATORY ISSUES

1. For facilities, like Monsanto, seeking a RCRA permit, simply capping and monitoring solid waste management units will not be adequate to meet the 3004 (u) and 3008 (h) provisions of RCRA as they relate to continuing releases from those solid waste management units. (See Appendix I.)

2. The Geraghty and Miller proposals will not eliminate releases to groundwater and subsequent disposal into the environment. Goundwater is a state resource, not Monsanto's resource to contaminate as they find it economically convenient. (See Appendix G.)

3. In a letter to Monsanto dated December 18, 1986, the Illinois EPA declared the proposal to cap the Krummrich Drum Site to be

unacceptable. Illinois EPA is already committed to requiring remedial alternatives at the site which better meet the requirements of the Illinois Environmental Protection act and CERCLA Reauthorization. This means permanent solutions and alternatives to land disposal. (See Appendix F.)

III. APPENDICES

A. R.L. Johnson on the Krummrich Drum Site.

B. R.L. Johnson on the Sauget Treatment Plant Site.

C. Tom Hornshaw and Connie Sullinger on the Krummrich Drum Site.

D. Connie Sullinger and Tom Hornshaw on the Sauget Treatment Plant Site.

E. Tom Hornshaw and Connie Sullinger on the Sauget Treatment Plant Site.

F. William C. Chicld letter to Monsanto.

G. Geordie Smith on the Krummrich Plant Site.

H. Rob Watson on the Krummrich Plant Site.

I. Rob Watson on the Sauget Treatment Plant Site.

J. Angela Tin on Sauget Treatment Plant and Krummrich Plant Sites.

Will send under separate cover